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**PATENT**

I claim:

1. A method of adjusting the value of at least one selected pixel in a group of pixels representing light reflected from a bump which projects from a wafer surface, the method comprising:

selecting at least one pixel having a value which is to be adjusted;

determining a gray level gradient in a plurality of directions with respect to the selected pixel; and

adjusting the value of the selected pixel based upon the values of pixels along the direction at which the gray level gradient is the greatest, whereby the value of the selected pixel is adjusted to more accurately correspond to light reflected from the bump.

2. A method according to claim 1 in which the selected pixel is at least one dead pixel from a time delay and integration camera.

3. A method according to claim 1 in which the act of selecting at least one pixel comprises selecting a plurality of dead pixels from a time delay and integration camera and repeating the other acts of claims 1 for each of the selected dead pixels.

4. A method of adjusting the value of at least one selected pixel from a time delay and integration camera such that the value of the pixel more accurately corresponds to light reflected from a light reflective bump projecting from a wafer surface, the method comprising:

selecting a pixel having a value which is to be adjusted;

determining a gray level gradient in a plurality of directions with respect to the selected pixel;

determining the direction from the plurality of directions along which the gray level gradient is the greatest; and

adjusting the value of the selected pixel based upon the values of pixels along the direction at which the gray level gradient is the greatest.

5. A method according to claim 4 comprising the act of selecting a plurality of pixels and repeating the acts of claim 1 for each of the selected pixels.

6. A method according to claim 5 wherein the time delay and integration camera has a field of view which is a first number of rows of pixels by a first number of columns of pixels, the field of view being subdivided into taps, at least one pixel of each row in each tap being a dead pixel in that it has a value which is compromised, the selected pixels corresponding to the dead pixels.

7. A method according to claim 4 in which the act of determining a gray level gradient in a plurality of directions comprises the act of determining the gray level gradient using pixels along a plurality of lines which intersect the selected pixel.

8. A method according to claim 7 wherein there are at least three of such lines.

9. A method according to claim 8 in which the lines extend along a row of pixels including the selected pixel and along respective diagonal directions relative to the selected pixel.

10. A method according to claim 8 in which the selected pixel is intermediate to a plurality of pixels along each of the lines and the value of the pixel is adjusted by interpolation along the line along which the gray level gradient is the greatest.

11. A method according to claim 10 in which the interpolation is accomplished using least square means interpolation.

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12. A method according to claim 8 in which the selected pixel is end pixel of each of the lines of pixels and the value of the pixel is adjusted by extrapolation from other pixels along the line along which the gray level gradient is the greatest.

13. A method according to claim 12 in which extrapolation is accomplished by straight line extrapolation.

14. A method of adjusting the value of at least one selected pixel in a group of pixels from a time delay and integration camera comprising:

selecting at least one dead pixel from the time delay and integration camera output;

determining a gray level gradient in a plurality of directions with respect to the selected pixel;

determining the direction from the plurality of directions along which the gray level gradient is the greatest; and

adjusting the value of the selected pixel based upon the values of pixels along the direction at which the gray level gradient is the greatest.

15. A method according to claim 14 wherein the time delay and integration camera has a field of view which is a first number of rows of pixels by a first number of columns of pixels, the field of view being subdivided into taps, at least one pixel of each row in each tap being a dead pixel in that it has a value which is compromised, the selected pixels corresponding to the dead pixels.

16. A method according to claim 14 in which the act of determining a gray level gradient in a plurality of directions comprises the act of determining the gray level gradient using pixels along a plurality of lines which intersect the selected pixel;

wherein there are at least three of such lines;

in which the lines extend along a row of pixels including the selected pixel and along respective diagonal directions relative to the selected pixel; and

in which the selected pixel is intermediate to a plurality of pixels along each of the lines and the value of the pixel is adjusted by interpolation along the line along which the gray level gradient is the greatest.

17. A method according to claim 16 in which the interpolation is accomplished using least square means interpolation.

18. A method according to claim 14 in which the act of determining a gray level gradient in a plurality of directions comprises the act of determining the gray level gradient using pixels along a plurality of lines which intersect the selected pixel;

wherein there are at least three of such lines; and

in which the selected pixel is an end pixel of each of the lines of pixels and the value of the pixel is adjusted by extrapolation from other pixels along the line along which the gray level gradient is the greatest.

19. A method according to claim 18 in which extrapolation is accomplished by straight line extrapolation.

20. A method according to claim 14 in which the act of determining a gray level gradient in a plurality of directions comprises the act of determining the gray level gradient using pixels along a plurality of lines which intersect the selected pixel;

wherein there are at least three of such lines;

in which the lines extend along a row of pixels including the selected pixel and along respective diagonal directions relative to the selected pixel;

in which the selected pixel is intermediate to a plurality of pixels along each of the lines and the value of the pixel is adjusted by interpolation along the line along which the gray level gradient is the greatest; and

in which the selected pixel is an end pixel of each of the lines of pixels and the value of the pixel is adjusted by extrapolation from other pixels along the line along which the gray level gradient is the greatest.

21. A method of adjusting the value of at least one selected pixel in a group of pixels arranged in columns and rows, the method comprising:

determine a neighborhood of a plurality of pixels adjacent to the selected pixel;

determining the direction of the maximum gray line gradient of pixels in the neighborhood along a plurality of directions intersecting the selected pixel; and

adjusting the value of the selected pixel by assigning a value to the selected pixel corresponding to the value the selected pixel would have along the line having the maximum gray line gradient.

22. A method according to claim 21 in which the neighborhood is five rows of pixels by five rows of columns of pixels with the at least one selected pixel being the center pixel of the five rows and five columns of pixels.

23. A method according to claim 21 in which the neighborhood is five rows of pixels by three columns of pixels and wherein the at least one selected pixel is a middle pixel in one of the outer columns of pixels in the neighborhood.

24. An apparatus for adjusting the value of at least one selected pixel in a group of pixels representing light reflected from a bump which projects from a wafer surface, the apparatus comprising:

a time delay and integration camera which produces an output of pixels corresponding to an array of pixels having a plurality of rows and columns; and

a processor operable to substitute a computed pixel value for the pixel value corresponding to at least one selected pixel, the processor being operable to evaluate the values of a plurality of pixels in proximity to the at least one selected pixel and to determine a direction from the evaluated pixel along which a maximum gray line gradient is located, the processor assigning a value to the at least one selected pixel based upon the values of pixels along the line having the maximum gray line gradient.

25. An apparatus according to claim 24 in which the processor applies least square means interpolation to at least certain selected pixels and straight line interpretation to at least certain selected pixels.

26. An apparatus according to claim 24 in which the time delay and integration camera produces an output which includes dead pixels, the at least one selected pixel comprising dead pixels.

27. An apparatus for adjusting the value of at least one selected pixel in a group of pixels representing light reflected from a bump which projects from a wafer surface, the apparatus comprising:

means for determining the maximum gray line gradient along a line intersecting a plurality of pixels and a selected pixel;

means for assigning a pixel value to the selected pixel corresponding to the value the pixel would along the line of maximum gray line gradient.